AMENDMENT(S) TO THE CLAIMS:

The following listing of claims will replace all prior versions, and listings, of claims on the application. All claims are set forth below with one of the following annotations.

- (Original): Claim filed with the application.
- (Currently amended): Claim being amended in the current amendment paper.
- (Canceled): Claim cancelled or deleted from the application. No claim text is shown.
- (Withdrawn): Claim still in the application, but in a non-elected status.
- (New): Claim being added in the current amendment paper.
- (Previously presented): Claim added or amended in an earlier amendment paper.
- (Not entered): Claim presented in a previous amendment, but not entered or whose entry status unknown. No claim text is shown.

1. (Currently amended) An apparatus ~~Apparatus~~ for transmitting an OFDM signal, said apparatus comprising:

a transform block that converts a group of subcarriers of an OFDM symbol to a set of time domain samples of said OFDM symbol to form a time domain burst; and

a frequency domain mapping block that assigns modulated subcarriers of said group to subchannels of said OFDM symbol so that said transform block outputs a time domain digital signal positioned at an ~~IF~~ intermediate frequency (IF), and that adjusts values of subcarriers of said group of subcarriers so that said samples of said OFDM symbol have strictly real values,

such that there are a total of N values for N positive and negative frequency subchannels to be converted to ~~the~~ a set of real-valued time domain samples,

wherein the transform block includes a preprocessor to map the ~~series of~~ N values to a first ~~series of N/2 values~~ N/2-point complex-valued series using a first mapping function, an n/2-point transformer to perform an inverse discrete Fourier transform on said first

N/2-point complex-valued series to obtain a second N/2-point complex-valued series; and a postprocessor to map real and imaginary components of said second N/2-point complex-valued series to the set of real-valued time domain samples using a second mapping function.

2. Cancelled.

3. (Original) The apparatus of claim 1 further comprising a cyclic prefix block that adds a cyclic prefix to said time domain burst.

4. (Currently amended) The apparatus of claim 3 further comprising:

a digital to analog converter that generates an analog signal derived from an output ~~output~~ of said transform block without time domain digital filtering.

5. (Currently amended) An apparatus ~~Apparatus~~ for receiving an OFDM signal, said apparatus comprising:

a cyclic prefix removal block to remove a cyclic prefix from samples of a received time domain OFDM signal to provide a series of N received time domain samples;

a transform block that converts the series of N received time domain samples to a frequency domain OFDM symbol comprising a set of complex valued subcarriers; and

a frequency domain symbol processing block that selects subcarriers of said frequency domain OFDM symbol centered at an ~~IF~~ intermediate frequency (IF) as baseband frequency domain symbols, thereby frequency shifting said selected subcarriers to baseband,

wherein the series of N received time domain samples are real-valued, and wherein the transform block includes a preprocessor to map the series of N received time domain samples to a first N/2-point series of ~~N/2~~ values using a first mapping function, a transformer to perform an FFT on said first N/2-point series of values to obtain a second N/2-point series of values; and a postprocessor to

map the second N/2-point ~~set~~ series of values to a total of N real and imaginary valued subcarriers at a corresponding set of N frequency subchannels, including the selected subcarriers to be shifted to baseband, the postprocessor using a second mapping function.

6. Cancelled.

7. (Original) The apparatus of claim 5 further comprising:

an analog to digital converter that converts an IF analog signal to provide said time domain samples without time domain digital filtering.

8. (Currently amended) The apparatus of claim 7 ~~claim 5~~ wherein said analog to digital converter ~~over samples~~ oversamples said analog signal.

9. (Currently amended) A method for transmitting an OFDM signal, said method comprising:

assigning subcarriers to subchannels centered around an ~~IF~~ intermediate frequency (IF) within ~~an OFDM~~ a frequency domain OFDM symbol to implement a frequency shift to that IF such that there are a total of N values for N positive and negative frequency subchannels;

converting said N values for N subchannels of the frequency domain OFDM symbol to real-valued time domain samples; the step of converting ~~of~~ including:

mapping the N values to a first N/2-point complex-valued series ~~of N/2 values~~ using a first mapping function;

performing an N/2-point inverse discrete Fourier transform on said first N/2-point complex-valued series to obtain a second N/2-point complex-valued series; and

mapping real and imaginary components of said second N/2-point complex-valued series to a set of real-valued time domain samples using a second mapping function; and

transmitting a signal based on said real-valued time domain samples.

10. (Currently amended) ~~(Original)~~ The method of claim 9 further comprising:

generating an analog signal based on said real-valued time domain samples without time domain digital filtering.

11. (Currently amended) A method of using an N/2-point transform to transform an N-point ~~a N-point~~ complex-valued series to an N-point real-valued series, said method comprising:

mapping said N-point complex-valued series to a first N/2-point complex-valued series using a first mapping function;

performing an inverse discrete Fourier transform on said first N/2-point complex-valued series to obtain a second N/2-point complex-valued series; and

mapping real and imaginary components of said second N/2-point complex-valued series to said N-point real-valued series using a second mapping function.

12. (Currently amended) The method of claim 11 wherein said first mapping function comprises:

$$R(A) = [X_r(A) - X_r(B)] * \sin A + [X_i(A) + X_i(B)] * \cos A - X_r(A) - X_r(B)$$

$$R(B) = [X_r(B) - X_r(A)] * \sin A - [X_i(A) + X_i(B)] * \cos A - X_r(A) - X_r(B)$$

$$I(A) = [X_i(B) + X_i(A)] * \sin A + [X_r(B) - X_r(A)] * \cos A - X_i(A) + X_i(B)$$

$$I(B) = [X_i(B) + X_i(A)] * \sin A + [X_r(B) - X_r(A)] * \cos A + X_i(A) - X_i(B)$$

wherein $A + B = N$, $R(m)$ is a real component of an mth point of said first N/2-point complex-valued series, $I(m)$ is an imaginary component of said mth point; $X_r(p)$ is a real component of a pth point of said N-point ~~N-point~~ complex-valued series, and $X_i(p)$ is an imaginary component of said pth point.

13. (Currently amended) The method of claim 11 wherein said second mapping function comprises:

$x(2k)= y_r(k)$, $x(2k+1)= y_i(k)$ wherein $x(p)$ is a real-only value of a pth component of said N-point real-valued series, $y_r(k)$ is a real component of a kth complex point of said second N/2-point ~~N/2~~ complex-valued series, and $y_i(k)$ is an imaginary component of said kth complex point.

14. (Currently amended) A method for receiving an OFDM signal, said method comprising:

converting a series of N real-valued time domain samples of a received OFDM signal to a frequency domain OFDM symbol using ~~a transform~~ an N/2-point ~~transform~~ transformer, including:

mapping the series of N real-valued time domain samples to a first series of ~~N/2~~ N/2-point values using a first mapping function;

transforming the first ~~series~~ N/2-point series of values using the N/2-point transformer to perform an FFT on said first N/2-point series of values to obtain a second N/2-point series of values; and

mapping the second N/2-point series of values to a total of N real and imaginary valued subcarriers at a corresponding set of N frequency subchannels using a second mapping function; and

selecting subcarriers from said frequency OFDM domain symbol to effect a frequency shift from an ~~IF~~ intermediate frequency (IF) to baseband.

15. (Cancelled).

16. (Currently amended) ~~(Original)~~ The method of claim 14 further comprising:

converting an IF analog signal to a digital signal used to generate said real-valued time domain samples without time domain digital filtering.

17. (Currently amended) The method of claim 16 ~~claim 15~~ wherein converting comprises oversampling said IF analog signal.

18. (Currently amended) An apparatus ~~Apparatus~~ for transmitting an OFDM signal, said apparatus comprising:

means for assigning subcarriers to subchannels centered around an ~~IF~~ intermediate frequency (IF) within ~~an OFDM frequency~~ a frequency domain OFDM symbol to implement a frequency shift to that IF such that there are a total of N values for N positive and negative frequency subchannels;

means for converting said N values for N subchannels of the frequency domain OFDM symbol to real-valued time domain samples; the means for converting ~~of~~ including:

means for mapping the N values to a first N/2-point complex-valued series ~~of N/2 values~~ using a first mapping function;

means for performing an N/2-point inverse discrete Fourier transform on said first N/2-point complex-valued series to obtain a second N/2-point complex-valued series; and

means for mapping real and imaginary components of said second N/2-point complex-valued series to a set of real-valued time domain samples using a second mapping function; and

means for transmitting a signal based on said real-valued time domain samples.

19. (Currently amended) An apparatus ~~Apparatus~~ for receiving an OFDM signal, said apparatus comprising:

means for converting a series of N real-valued time domain samples of a received OFDM signal to a frequency domain OFDM symbol using a ~~a transform~~ an N/2-point transformer ~~transform~~, the means for converting including:

first mapping means for mapping the series of N real-valued time domain samples to a first N/2-point series of ~~N/2~~ values using a first mapping function;

means for transforming the first ~~series~~ N/2-point series of values using the N/2-point transformer to perform an FFT on said first N/2-point series of values to obtain a second N/2-point series of values; and

second means for mapping the second N/2-point series of values to a total of N real and imaginary valued subcarriers at a corresponding set of N frequency subchannels using a second mapping function; and

means for selecting subcarriers from said frequency domain OFDM symbol to effect a frequency shift from an ~~IF~~ intermediate frequency (IF) to baseband.

20. (Currently amended) A computer program product for transmitting an OFDM signal, said computer program product comprising:

code that assigns subcarriers to subchannels centered around an ~~IF~~ intermediate frequency (IF) within a frequency domain OFDM symbol to implement a frequency shift to that IF such that there are a total of N values for N positive and negative frequency subchannels;

code that converts said N values for N subchannels of the frequency domain OFDM symbol to real-valued time domain samples, including code for:

mapping the N values to a first N/2-point series ~~of N/2 values~~ using a first mapping function;

performing an N/2-point inverse discrete Fourier transform on said first N/2-point complex-valued series to obtain a second N/2-point complex-valued series; and

mapping real and imaginary components of said second N/2-point complex-valued series to a set of real-valued time domain samples using a second mapping function; ~~and~~

code that causes a transmitter to ~~transmits~~ transmit a signal based on said real-valued time domain samples; and

a computer-readable storage medium that stores the codes.

21. (Cancelled).

22. (Currently amended) A computer program product for using an N/2-point to transform N-point complex-valued series to an N-point real-valued series, said computer program product comprising:

code that maps said N-point complex-valued series to a first N/2-point complex-valued series using a first mapping function;

code that performs an inverse fast Fourier transform on said first N/2-point complex-valued series to obtain a second N/2-point ~~N/2~~ complex-valued series;

code that maps real and imaginary components of said second N/2-point complex-valued series to the N-point complex-valued ~~real-valued~~ series using a second mapping function; and

a computer readable storage medium that stores the codes.

23. (Currently amended) The computer program product of claim 22 wherein said first mapping function comprises:

$$R(A) = [X_r(A) - X_r(B)] * \sin A + [X_i(A) + X_i(B)] * \cos A - X_r(A) - X_r(B)$$

$$R(B) = [X_r(B) - X_r(A)] * \sin A - [X_i(A) + X_i(B)] * \cos A - X_r(A) - X_r(B)$$

$$I(A) = [X_i(B) + X_i(A)] * \sin A + [X_r(B) - X_r(A)] * \cos A - X_i(A) + X_i(B)$$

$$I(B) = [X_i(B) + X_i(A)] * \sin A + [X_r(B) - X_r(A)] * \cos A + X_i(A) - X_i(B)$$

wherein $A + B = N$, $R(m)$ is a real component of an mth point of said first N/2-point complex-valued series, $I(m)$ is an imaginary component of said mth

point; $X_I(p)$ is a real component of a pth point of said N-point ~~N-point~~ complex-valued series, and $X_I(p)$ is an imaginary component of said pth point.

24. (Currently amended) A computer program product for receiving an OFDM signal, said computer program product comprising:

code that converts a series of N real-valued time domain samples of a received OFDM signal to a frequency domain OFDM symbol using a ~~transform~~ an N/2-point transformer ~~transform~~, the code that converts including code for:

mapping the series of N real-valued time domain samples to a first N/2-point series of ~~N/2~~ values using a first mapping function;

transforming the first N/2-point series of values ~~series~~ using the N/2-point transformer to perform an FFT on said first N/2-point series of values to obtain a second N/2-point series of values; and

mapping the second N/2-point series of values to a total of N real and imaginary valued subcarriers at a corresponding set of N frequency subchannels using a second mapping function;

code that selects subcarriers from said frequency domain OFDM symbol to effect a frequency shift from an ~~IF~~ intermediate frequency (IF) to baseband; and

a computer-readable storage medium that stores the code that converts and the code that selects.

25. (Cancelled)